DOCUMENT RESUME

ED 169 567 CS 204 806

AUTHOR Pedersen, Elray L.
TITLE Sentence-Combining Practice: Training that Improves Student Writing.
PUB DATE [78]
NOTE 24p.; Study prepared at Weber State College ; Best copy available

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Composition (Literary); Educational Research; Elementary Education; Grade 7; Language Development; Semantics; *Sentence Combining; Sentences; Sentence Structure; *Student Improvement; Syntax; Writing Exercises; *Writing Skills

ABSTRACT

A total of 113 seventh grade students participated in a study to test the effectiveness of sentence combining practice as a means to significantly improve syntactic and semantic fluency in student writing. Methods included pretest, posttest, and delayed posttest t-unit analyses of syntactic fluency, and four pretest and posttest analyses of student narrative compositions: a forced-choice evaluation of compositions, a semantic differential analysis of 14 specific perceived attributes of composition quality, type-token measures, and lexical density measures of meaningful expression. The findings supported the conclusion that sentence combining experiences are consistent, highly powerful, and broadly influential ways of eliciting better student writing. (Author/RL)

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Sentence-combining Practice: Training that Improves Student Writing

ABSTRACT Elray L. Pedersen

This study tested the effectiveness of sentence-combining practice associated with significantly improved syntactic and semantic fluency in student writing. Methods included a pre-, post- and delayed post-test t-unit analysis of snytactic fluency; and four different pre- and post-test analyses of student narrative compositions: (1) a forced-choice evaluation of compositions; (2) a Semantic Differential analysis of 14 specific perceived attributes of composition quality; (3) Type-token and (4) Lexical Density measures of meaningful expression. Findings support the conclusion that sentence-combining experiences are consistent, highly-powerful, broadly-influential in eliciting improved student writing.

BACKGROUND ANL SIGNIFICANCE. Current research on the elementary, junior high and college levels reports that sentence-combining (SC) language experience consistently stimulates growth in syntactic fluency, the structural maturity and complexity of student writing (Ney, 23; Raub, 36; Miller and Ney, 20; Mellon, 19; Vitale and others, 40; Obenchain, 25; Fischer, 13; O'Hare, 28; Perron, 32; Combs, 7, 8; Callahan, 3; Sullivan, 39; Stewart, 37; Maimon and Nodine, 17; Daiker, Kerek and Morenberg, 10).

In addition, research on the junior high and college levels suggests that practicing sentence-combining is accompanied by dramatic gains in judged overall quality of writing (O'Hare, 28; Combs, 7, 9; Waterfall, 41; Daiker, Kerek and Morenberg, 10: Stewart, 37).

THE PROBLEM. Attempting to discover whether measured, beneficial values of SC practice are associated with writing improvement, the present study considered four major issues relating to the above findings:

(1) Combs (7,8) argues that reported growth in syntactic fluency must prove itself self-sustaining and long-lasting, otherwise SC practice is possibly a worthless cosmetic veneer or an ineffective treatment.
(2) Marzano (18) argues that reported gains in judged over all quality of writing are misleading, this conclusion based on the fact that no specific ways have been found in which the writing of experimental subjects is determined different from, or better than, the writing of comparable control subjects.
(3) O'Hare (28) speculates that SC practice induces subjects to use more details and improved content in their writing than they ordinarily would include, but this claim has gone untested.

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(4) Hunt (15) suggests that SC practice constrains subjects to conceptualize more meaningfully and to use extra content in their writing, but this speculation remains uninvestigated.

Accordingly, the issues raised above suggest a critical need to study possible values of SC practice in helping students to more effectively conceptualize, integrate and express their ideas and feelings in writing.

HYPOTHESES. Derived from the speculations above, four hypotheses are investigated in this study (p. = .05). It was hypothesized that experimental subjects, immersed in SC language experience, would score significantly higher than equivalent control subjects in:

(1) achieving and sustaining gains in syntactic fluency as measured by words per t-unit counts at post-test and delayed post-test times;
(2) achieving gains in judged overall quality of writing as determined by a panel of experts;
(3) achieving gains on specific perceived attributes of composition quality such as idea development, presence and concreteness of details and maturity of conceptualized student content as measured by a Semantic Differential assessment of student essays;
(4) achieving gains in semantic fluency as determined by Type-token and Lexical Density assessments of student essays.

SUBJECTS. Selected from a large suburban school district in North Central Utah, subjects were 113 seventh-grade pupils, consisting of 56 girls and 57 boys and comprising four in-tact classes. Seventh-grade subjects were chosen because O'Donnell and others (27) show this period to be particularly important for rapid language growth and because established research methods and materials could be replicated and results compared with other studies of seventh-grade writing conducted by Mellon (19), O'Hare (28) and Combs (7).

In order to determine whether the four in-tact classes studied were equivalent and appropriate for this experiment, Lorge-Thorndike I.Q. test scores were used to run t-tests on group means. No significant difference

between experimental and control group means was found. In addition, in order to reduce sampling errors and increase statistical precision (Borg and Gall, 1), eighteen pairs of students were selected from the population and matched according to sex and I.Q. A correlation test, run on the I.Q. scores of these eighteen control and experimental subjects, showed an r of .99. Other correlations run on the two groups showed scores of .69 on Language Ability; .59 on the SRA Battery of Achievement tests; and .41 on Reading Comprehension.

MEASURES. In this study, one measure determined growth in snytactic fluency and four different measures determined gains in the quality and quantity of conceptualization, maturity, and effectiveness of expression of student meaning.

Measuring Syntactic Fluency. Following the suggestion of Hunt (15) and the conclusion of O'Donnell (26) that ". . . t-unit length is still the most useful and useable index of syntactic development. . . ."(p.38), syntactic fluency levels in this study were determined by calculating the number of words per t-unit, following guidelines set forth in Hunt (15) and summarized in Combs (7). (A t-unit is a minimal terminal unit, a main clause sentence together with all accompanying dependent clauses and modifiers.) Further, as opposed to procedures in Mellon (19) that required a sample of 90 t-units per subject per test and those in O'Hare (28) which required 50 t-units per subject per test, this study followed procedures established in Combs (7) which demonstrated that 15 t-units from each of two different student essays (30 t-units in all) were adequate to establish syntactic fluency levels for subjects' narrative and descriptive writing.

Reliability. Two raters were recruited and trained to check syntactic fluency scores reported herein. One a doctoral candidate in English, the other a lay reader of college compositions, these raters independently evaluated 1/3 of the pre-test and post-test compositions, as well as all delayed post-test compositions written by the matched pairs of students.

Measuring Judged Overall Quality of Writing. The procedures of O'Hare (28) and Combs (7) were replicated to determine judged overall quality of writing. Submitted to a trained panel of six professional teachers of composition, matched pairs of compositions were judged holistically, with the paper written by either a member of the control or experimental group being determined as better or worse than its matched counterpart. This forced-choice test did not attempt to measure how much better one paper was than another, nor did it indicate any specific ways or degrees to which one paper was different from another. It simply replicated the procedures of O'Hare and Combs to check on their findings.

Measuring Perceived Attributes of Composition Quality. To discover and measure ways in which and degrees to which specific perceived attributes of student writing might be influenced by SC practice, a Semantic Differential test was used (Osgood, 29 .) During a thirty minute taping session, raters discussed the question, "What constitutes effective, mature content in student writing?" Raters suggested in their discussion fourteen major qualities, perceived attributes of writing, which they thought characterized excellent, meaningful student content. Placed on a polar scale with seven intervals between them, the fourteen attributes and their opposites included: unified--disorganized; specific--general; interesting--boring; complex--simple; sensitive--insensitive; clear--unclear;

logical--illogical; developed--undeveloped; mature--immature; concrete--vague; varied--monotonous; creative--trite; coherent--incoherent; consistent--inconsistent. In order to assure internal validity of the test instrument, care was taken to invert half of the pairs.

Measuring Student Meaning. Two additional measures were used to determine gains or losses in conceptualization, integration and expression of student meaning. A Type-token Word Count (Miller, 21) assessed the number of different vs. the number of same words used in the first 100 words of each student paper. Use of this test assumed that subjects with more to say say it with more different words than subjects use who have less to say. In essence this test is a redundancy index. A Lexical Density Word Count (Perfetti, 31) divided the first 100 words of student essays into either semantic words (nouns, verbs, adjectives, adverbs) or grammatical words (articles, prepositions, etc.) Use of this test assumed that subjects exposed to SC treatment will use proportionately more meaning-bearing words, not grammatical relationship words, than they ordinarily would include in their writing.

DESIGN. Because subjects came from in-tact classrooms, as opposed to being randomly assigned, the design in this study is essentially the non-equivalent Control Group Design outlined in Campbell and Stanley (4). Two variations in this design occurred. To measure durability of effects, a delayed post-test (given eight weeks after the end of the treatment) was added; and to gain statistical precision, post-hoc matching into pairs of control and experimental subjects, based on sex and IQ, was accomplished (Borg and Gall, 1).

PROCEDURES. During the first week of school, Lorge-Thorndike I.Q. tests were administered, and subjects were pre-tested by responding to topics adapted from Mellon (19). Assignment of topics was counter-

balanced so that 1/2 of the students wrote on pre-test topics and 1/2 wrote on post-test ones. Moreover, on a given day 1/3 of the subjects wrote in one mode of discourse (narration), another 1/3 another mode (description) and the final 1/3 another mode (exposition.) Hence, counterbalancing helped to minimize effects associated with mode of discourse, time of writing and topic assigned (Braddock, 2).

Assignment of Teachers. To reduce teacher and time of day effects, one teacher taught an experimental class in the morning and a control class in the afternoon. A second teacher taught a morning control and an afternoon experimental class. Teachers had no previous experience with SC practice.

Control-group Curriculum. The seventh-grade curriculum in this study followed district guidelines and was supervised by the cooperating teachers. The grammar and writing text was Guth and Schuster's Exploring English Today. Literature texts were Pooley's Wide, Wide World, Gipson's Old Yeller, O'Dell's Sing Down the Moon, Forbes' Johnny Tremain; and the spelling text, Benthal's Spell Correctly.

Classtime throughout the year allowed fifteen minutes each Monday for USSW (Uninterrupted Sustained Silent Writing in journals) and all class period each Friday (50 minutes) for USSR (Uninterrupted, Sustained Silent Reading of all types of materials.)

Experimental-group Curriculum. With the exception of the inclusion of SC exercises (the independent variable) into the experimental group, the curriculum of the experimental and control groups was identical. To include SC practice in the treatment group, in-class time for all activities was shortened, especially the USSR time, allowing for 1 1/4 - 1 1/2 hours per week of SC practice.

SC Lessons. O'Hare's and Comb's Sentence-Combining exercises (SCE's) were used in this study. Signals and processes set forth in these original lessons were followed faithfully, but alterations in phraseology and content were made to adapt some content to local and regional interests of students.

Curriculum between Post- and Delayed Post-test Time. The curriculum sketched above was completed by all students in fifteen weeks. Post-testing took place the last week of the first semester, following the counter-balancing procedures already sketched. After post-testing no mention was made of SC practice in either the control or the experimental group, and the curriculum of all classes was held as nearly identical as possible in order to measure for possible effects at delayed post-test time, eight weeks after the end of the treatment. The delayed post-test consisted of having students write on three different topics in three different modes on three different days.

FINDINGS. The four hypotheses investigated in this study were accepted. Seventh-grade subjects trained in SC scored significantly higher than control subjects in achieving and sustaining growth in syntactic fluency. What is more important, it was found that subjects trained in SC scored significantly higher than comparable control subjects on four different measures of improved conceptualization and expression of meaning. The general findings of this study, therefore, clearly suggest a strong relationship between one's linguistic ability to express ideas, feelings and experiences (syntactic fluency) and one's mental ability to conceptualize and express integrated, meaningful content (semantic fluency).

Syntactic Fluency. Table 1 reports pre-test, post-test and delayed post-test syntactic fluency scores achieved by control and experimental

subjects. Control subjects made normal but slow gains as should be expected (Hunt, 14 ; O'Donnell and others, 27 .) In contrast, experimental subjects achieved rapid growth at significant levels before, but not after post-test time. Comparing growth achieved in this study with other seventh-grade studies, Table 2 suggests that one to two years' growth in syntactic fluency can be elicited in ten to fifteen weeks of SC practice. Table 2 also suggests that achieving gains at or near the levels reported by O'Hare (28) appears unrealistic.

More important is the issue of whether achieved growth in syntactic fluency persists at significant levels long after the end of the treatment. Combs (7) reported that it does. Chart 1 indicates that subjects in this study not only achieved significant growth at post-test time, but added to it at delayed post-test time. Sullivan (39) in a more recent research report affirms the finding of this study that achieved gains in syntactic fluency are permanent, not temporary.

Overall Quality of Writing. Table 3 shows that on the forced-choice pre-test of student narrative compositions, 49% of the papers from the experimental and 51% of those form the control group were judged by professional raters as being better in general, or overall, quality of writing. Table 3 also shows that at post-test time, 68% of the experimental and only 32% of the control group papers were judged as better, evidencing a clear-cut preference for papers written by subjects who had been trained in SC. This finding replicates with consistency the findings previously set forth by O'Hare (28) and Combs (7). The six professional raters making these judgments averaged seven years of experience teaching writing in the junior or senior high school.

Teachers' Subjective Evaluations of Attributes of Composition Quality. Table 4 shows that at pre-test time between-group comparability existed on all fourteen factors of the SD Instrument. Table 5 summarizes control vs. experimental gains achieved on narrative writing at post-test time. Three perceived attributes of composition quality were found to be at significant levels at post-test time: Development of Ideas was significant at the .01 level; both Maturity and Concreteness of Content were significant at the .05 level. These findings support strongly the speculation of O'Hare (28) that SC practice tends to foster more mature content with increased specificity and quality of details in subjects' writing. They also meet the demands of Marzano (18) who called for discovered ways in which and measured degrees to which the writing of subjects who have trained in SC is different from the writing of subjects who are untrained in SC. The recent findings of Daiker, Kerek and Morenberg (10)support the findings reported herein. The latter study shows differences between control and experimental subjects' writing significant at post-test time in the areas of Presence of Ideas, Use of Supporting Details, Improved Use of Voice, Effectiveness of Sentence Structure and Effectiveness of Diction.

Semantic Fluency. Table 6 and Table 7 show that on the Type-token and Lexical Density assessments of subjects' writing, no significant differences existed at pre-test time. At post-test time, significance was reached on both measures. Caution is urged in accepting achieved increases in the use of semantic-bearing words since significance was achieved by regression of growth in the control group, not gains in the writing of the experimental group. The findings of these tests support the position that more mature and more extra meaning is packed into the writing of subjects who engage in language experience, affirming Hunt's early speculation (15).

DISCUSSION. This study investigated four major issues previously raised concerning SC practice, adding new dimensions to SC research and clearing up some ambiguity associated with reported findings of previous studies. As summarized herein, SC practice is a consistent, highly-powerful, broadly-influential tool found valuable to improve not only the HOW but also the WHAT of student writing.

Prior to this investigation, no SC study had identified and determined in measured units specific attributes of student writing improved at significant levels in association with SC training. Obviously SC practice is associated with improved details and better maturity and better development of content. More importantly, this is the first SC study to establish that improving student writing performances is much more than being able to string out words fluently (syntactic fluency.) Rather, improving student writing performances involves fluency in perceiving, storing, conceptualizing and expressing effectively something meaningful to say (semantic fluency.) SC training stretches out and makes fluent the various structures of language (syntactic fluency) in order that the mind can assimilate, integrate, and include more meaningful content in these structures (semantic fluency.) In writing, therefore, a symbiotic relationship exists between syntax and meaning. Structure cannot be independent of content, nor can meaningful content be independent of structure. As Christensen (6) put it, knowing HOW to write is directly associated with knowing WHAT to write.

Several other issues related to SC practice associated with improving student writing need discussion and clarification. These issues are discussed under the headings: syntactic fluency, overall quality of writing, perceived attributes of writing and semantic fluency.

Syntactic fluency. One of almost twenty, Ney's study (24) is the only published SC investigation failing to report achieved, significant growth in syntactic fluency at post-test time. Ney's study engaged college freshmen in SC practice and concluded, "Freshmen may have reached a stage of mental development where SCE's do not aid them in their writing abilities. (p. 76)" With the convincing evidence of many studies against this assertion, one must look for weaknesses in research design, procedures, treatments and computations to account for this conclusion. Daiker, Kerek and Morenberg (11) show emphatically that freshmen can and do achieve growth at significant levels, and further, they suggest Ney's study produced insignificant results because of a weakness in one or more of the following: the variable of teacher effect, the SC curriculum itself, the age of the students, the amount of time spent in the treatment. This last variable (too little time spent in the treatment) easily could account for insignificant findings of the Ney study. "A maximum of ten minutes," Ney reports, was devoted to SC training in each of 27 daily class periods, consisting roughly of four hours of instruction. One wonders what the daily minimum amount of time spent on syntactic calisthenics was. Will even two hours of instruction do the same as two years'? Time spent on task must be more precisely defined than in Ney. Indefinite or insufficient amounts of time spent on the task appear to be reason enough for failure to replicate expected research findings.

Currently a second, related issue about syntactic fluency is being raised. Callahan (3) and Sullivan (39) suggest that SCE's have a limited potential in being able to elicit growth in syntactic fluency. Sullivan reports that subjects who practiced 15 lessons in her study made gains as great as subjects who practiced twice that number, suggesting

that subjects reach saturation points, plateaus, in acquiring syntactic fluency. This suggestion needs investigation. No longitudinal study of induced growth in syntactic and semantic fluency has been undertaken yet. Such a study is needed.

A third issue relates to time spent on task and possible saturation effects associated with SC practice. A decade ago both Christensen (5) and Moffet (22) raised objections to the proliferation of SC practice, cautioning that attempts to hasten and enhance the development of syntactic fluency could possibly result in the production, by students, of highly-involved, bloated sentences. Two factors are critical here. First, current SC training is poorly conceptualized if one views the practice as simply learning to string more and more words together. Any basic set of SCE's involves a wide range of language experience and much practice in adding, deleting, substituting and rearranging words, sentence parts, whole sentences and even paragraphs. It involves matters of voice, organization, applied punctuation, logic and a host of other elements related to writing, all usually presented in a non-grammatical context. Second, Moffett skillfully answers his own objection when he argues that students should engage in natural language activities for, he says, a student's syntactic fluency must grow healthy and unrestrained before it can be pruned. Moffett (22) suggests that the evolutionary processes of snytax are these: Students begin their writing by expressing simple things simply. They move to expressing complex things complexly, and ultimately, they achieve the ability to express complex things simply, after the pruning has been accomplished. The findings of Daiker, Kerek and Morenberg (10) support this contention, for although subjects trained in SC practice achieved significant gains in the number of words per t-units, overall,

they actually used fewer words to say more in fewer sentences. Finally, no research yet reports induced SC writing considered too syntactically mature or too meaningful.

Overall Quality of Writing. O'Hare (28), Combs (7 and 9), Waterfall (41), Pedersen (30) Faigley (12) and Daiker, Kerek and Morenberg (10) all report significant gains in judged overall quality of writing, but Mellon (19), Ney (24), Callahan (3) and Sullivan (39) report none. Pedersen (30) suggests that the Mellon study's inability to affirm improved overall quality of writing was influenced by scoring procedures and teacher effect (one of the control group teachers proved to be a particularly excellent teacher.) The indefinite and insufficient amount of time spent on task related to the Ney study (24) has been discussed. Rather than it being a failure of the treatment being studied, in the past, inability to achieve significant research results has often been due to weaknesses related to research procedures, methods, and designs which contaminated reported results.

In view of the consistent findings of three different seventh-grade replications, the findings of the Canadian Sentence-combining Project which point toward significantly improved writing (Stewart, 37), the findings of Daiker and associates (10), reasons exist to accept the conclusion that SC practice is associated with improved writing quality.

Equally convincing is that fact that Combs (9) conducted a second study of judged overall quality of writing and found differences still significant eight weeks after post-test time.

Perceived Attributes of Student Writing. Improved, specific attributes of student writing have been measured and found at significant levels in

two studies, the Daiker, Kerek and Morenberg study (10) and the Pedersen study (30). Together, findings indicate improvements on a broad range of factors related to student writing: Improved ideas, voice, details, structure, diction, concretness, overall maturity and development, and increased fluency in conceptualizing and expressing meaningful content.

One of the major tests of researchers today as Kerek (16) points out is to determine precisely which elements of effective writing SC training promotes growth in and which ones it might retard. The results of the Exxon and Pedersen study both indicate that the types of exercises used in these studies did not, for whatever the reasons, encourage growth in unity and coherence. Perhaps exercises and experiences can be developed to not only improve coherence, but also to force growth among an even wider range of attributes of student writing.

The area of logic within and between clauses and sentences is an excellent prospect for such development. In this study, it was apparent to this researcher that subjects trained in SC were much more logical in the expression of their ideas at post-test time than were comparable, untrained subjects. The works of Pitkin (33, 34, and 35) serve as excellent touchstones to make a beginning to research this claim. SCE's involving the semantic and structural relationships within and between sentences is a potential fruitful area of research, demonstrating the profound and intricate symbiotic relationships between structure and meaning.

Semantic Fluency. Research into meaning and its expression in writing has just begun. Success of the t-unit measure in determining growth levels in syntactic fluency causes one to wish for and discover a gross measure to determine both the quality and the quantity of student

meaning being expressed in writing. And possession of a syntactic and semantic fluency measure, in turn, could cause one to wish for and discover a gross measure of grammatical fluency to establish levels of correctness in student writing. Armed with five or six different gross measures (related to writing effectiveness and established by research as being so), teachers could evaluate student writing more objectively than they do now, and they could prescribe specific curricular materials proven useful to improve observed deficiencies in student writing.

But for now, it must be concluded that much evidence currently calls for the widespread adoption and evaluation of SC materials in the classroom.

Table 1

Comparison of Mean Scores
(Pre-, Post-, and Delayed Post-test) on Induced
Syntactic Fluency: Control vs. Experimental Groups

Factor	Control Group Mean	Control Group SD	Experimental Group Mean	Experimental Group SD	Difference	t-value	df
W/TU							
Pretest	9.26	1.28	9.25	1.82	-.01	.01(NS)	34
Posttest	9.36	1.52	10.64	2.16	1.28	2.06*	34
Delayed Post	9.74	1.63	10.73	1.56	.99	1.84*	34

NS = not significant
* = significant at or beyond the .05 level

Table 2
Comparative Pre-Post Change Scores on W/T-unit
Mellon, O'Hare, Combs and Present Experimental Group

Year	Study	Weeks of SC Practice	Pre-test	Post-test	Change	Growth in Years
1969	Mellon	32	9.98	11.25	1.27	1
1973	O'Hare	23	9.63	15.75	6.12	5+
1975	Combs	10	9.48	11.69	2.17	2
1977	Present	15	9.25	10.64	1.39	1½

Growth in years is roughly computed as 1.0 word per year. (Hunt, 1965; O'Donnell and others, 1967) No norms are available for grades beyond twelve except for Hunt's (1965; 1970) norms for skilled, professional adults.

Table 3

Comparison Between Mean Number of Raters Selecting Compositions Matched (Experimental vs. Control Group)

	NUMBER OF COMPOSITIONS SELECTED					
	Experimental Group		Control Group			
	Mean	SD	Mean	SD	t-value	df
Pretest	2.94	1.71	3.06	1.81	.09(NS)	17
Posttest	4.05	1.77	1.95	1.83	3.46*	17

NS = not significant
* = significant at or beyond the .001 level

Table 4

Comparison of Control and Experimental Groups on Fourteen Factors of the SD Instrument at Pre-test Time

	Control Group		Experimental Group				
	Mean	SD	Mean	SD	Difference	t-value	df
1-Unity	4.49	.72	4.53	.67	.04	.11(NS)	34
2-Specificity	4.36	.66	4.71	.36	.35	1.12(NS)	34
3-Interest	4.04	.51	4.35	.48	.31	1.17(NS)	34
4-Complexity	3.55	.36	3.77	.31	.22	1.28(NS)	34
5-Sensitivity	4.02	.39	4.28	.32	.16	.03(NS)	34
6-Clarity	4.61	.60	4.63	.61	.02	.06(NS)	34
7-Logic	4.54	.63	4.55	.60	.01	1.15(NS)	34
8-Development	3.67	.39	4.03	.23	.36	.92(NS)	34
9-Maturity	3.76	.14	4.03	.19	.27	.86(NS)	34
10-Concreteness	4.41	.59	4.55	.32	.14	.74(NS)	34
11-Variety	3.76	.37	3.95	.24	.03	.27(NS)	34
12-Orginality	3.90	.37	4.02	.32	.12	.60(NS)	34
13-Coherence	4.47	.60	4.56	.66	.09	.22(NS)	34
14-Consistency	4.37	.53	4.28	.57	-.09	.68(NS)	34

NS = not significant

Table 5

Comparison of Control vs. Experimental Group Means at Post-test Time on Fourteen Factors Related to Student Content

Factor	Control Group Mean	SD	Experimental Group Mean	SD	Difference	t-value	df
1-Unity	4.46	.71	4.84	.61	.33	1.00(NS)	34
2-Specificity	4.40	.59	4.98	.46	.58	1.88(NS)	34
3-Interest	4.20	.63	4.64	.57	.44	1.20(NS)	34
4-Complexity	3.83	.49	4.25	.46	.42	1.50(NS)	34
5-Sensitivity	4.29	.40	4.48	.32	.31	.88(NS)	34
6-Clarity	4.66	.71	5.00	.52	.34	.92(NS)	34
7-Logic	4.16	.65	4.83	.63	.67	1.80(NS)	34
8-Development	3.88	.37	4.56	.50	.68	2.66**	34
9-Maturity	3.83	.53	4.42	.40	.59	2.15*	34
10-Concreteness	4.34	.62	4.95	.42	.61	2.16*	34
11-Variety	4.03	.73	4.34	.29	.31	.95(NS)	34
12-Originality	4.12	.46	4.31	.25	.19	.87(NS)	34
13-Coherence	4.65	.71	4.77	.47	.12	.37(NS)	34
14-Consistency	4.51	.63	4.72	.40	.21	.74(NS)	34

NS = not significant

* = significant at the .05 level

** = significant at the .01 level

Table 6

A Between-Group Comparison of Control and Experimental Pre-treatment and Post-treatment Mean Scores on the Type-token Word Frequency Index

	Mean	SD	t-value	df
PRE-TEST				
Control	61.61	5.34	.68(NS)	34
Experimental	60.33	5.84		
POST-TEST				
Control	61.94	4.62	1.77*	34
Experimental	64.88	5.70		

NS = not significant
* = significant at the .05 level

Table 7

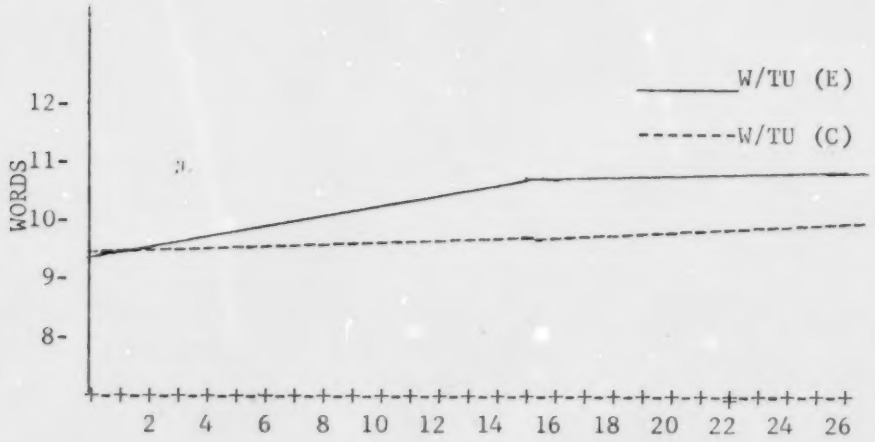
A Between-Group Comparison of Control and Experimental Pre-treatment and Post-treatment Mean Scores on the Lexical Density Index (Number of Grammatical Words per Hundred)

	Mean	SD	t-value	df
PRE-TEST				
Control	45.38	4.32	.03(NS)	34
Experimental	45.33	3.97		
POST-TEST				
Control	48.11	3.80	2.24*	34
Experimental	44.44			

NS = not significant
* = significant at the .05 level

Chart 1

Progress of Control and Experimental Groups
over 26 Weeks in this Study



TIME (in weeks)

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